



TENTATIVE

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14.1" WXGA

TECHNICAL SPECIFICATION

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AA141TA04--G1

mitsubishi electric corp.

Date: Jan.25,'10



CONTENTS

No.	Ite	Pa e
--	COVER	1
--	CONTENTS	2
1	APPLICATION	
2	OVERVIE	4
	ABSOLUTE MA IMUM RATINGS	5
4	ELECTRICAL CHARACTERISTICS	5, ,
5	INTERFACE PIN CONNECTION	,
	INTERFACE TIMING	10, 11, 12, 1 , 14
	BLOC DIAGRAM	15
	MECHANICAL SPECIFICATION	1 , 1
	OPTICAL CHARACTERISTICS	1 , 1 , 20
10	RELIABILIT TEST CONDITION	21
11	OTHER FEATURE	22
12	HANDLING PRECAUTIONS FOR TFT-LCD MODULE	2 , 24, 25

1. APPLICATION

This patent application is for TFT-LCD model, AA141TA04--G1.

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MITSUBISHI hereby gives the TFT-LCD model a name. Please refer to the name of the product.

(1) Standard Use

Computer, office equipment, calculator, data processing, text and image processing, communication, transportation equipment (aircraft, ship, train, etc.), projector, other, etc. at operation not necessarily TFT-LCD related.

(2) Special Use

Medical equipment, agricultural equipment, transportation equipment, projector, other, etc. at TFT-LCD related to operation.

(3) Special Use

Computer equipment, calculator, aircraft equipment, nuclear reactor control, etc., support the same as other equipment. MITSUBISHI hereby gives a name to the product at the point of operation and reports the name to MITSUBISHI and others.

The product name of the present invention is for Standard Use and other equipment. It is to be noted that the product or application of the present invention for Standard Use, the name of the product is MITSUBISHI and represents the name of the product.

MITSUBISHI hereby gives a name to the product and the product name. The product name is the name of the product and the name of the product. The product name is the name of the product and the name of the product.

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Please note that the name of MITSUBISHI is the name of the product and the name of the product. The product name is the name of the product and the name of the product.

2. OVERVIEW

AA141TA04--G1 14.1" o or TFT-LCD (T n F Tran tor L Cr ta D p a) o e
o po e o LCD pane , r er IC , ontro r t, a t n t an on e prote t e a .

B app n t or t ta ata, 12 0× 00, 2 2 - o or or 1 . M- o or a e are p a e
 on t e 14.1 a ona reen. Inp t po er o ta e . V or LCD r n .

Tempo di attesa tra la lettura di una riga e la scrittura della prossima riga è di 1MHz o meno.

In order for a treatment to be effective, generalizations are required:

ITEM	SPECIFICATION
D p a Area ()	0 . (H)×1 . (V) (14.1- n a ona)
N er o Dot	12 0× (H)× 00 (V)
P e P t ()	0.2 (H)×0.2 (V)
Co or P e Arran e ent	RGB ert a tr pe
D p a Mo e	Nor a te TN
N er o Co or	2 2 (t/ o or), 1 . M(t/ o or)
L nan e (/ 2)	550
e V e n An e Te no o	Opt a Co pen at on F
V e n An e (CR≥10)	– 0~ 0°(H), – 0~ 0°(V)
S r a e Treat ent	Ant -re e t on an ar - oat n H
E e tr a Inter a e	LVDS (t/ t)
Opt V e n An e (Contra t rat o)	o' o
Mo e S e ()	2.0 ()×222.5 (H)×1 .2 (D)
Mo e Ma ()	1 20
Ba t Un t	CCFL, 4-t e , e e- t, rep a ea e

Cara ter t a e t o t a n n o t e t p a a e.

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage for LCD	VCC	0	4.0	V
Logic Input Voltage	VI	-0.5	VCC+0.5	V
Lamp Voltage	VL	0	2000	Vr
Lamp Current	IL	0	10	Ar
Lamp Frequency	FL	--	100	Hz
Operating Temperature (Panel)	$T_{op(Panel)}$	-20	0	°C
Operating Temperature (Ambient)	$T_{op(Ambient)}$	-20	0	°C
Storage Temperature	T_{st}	-20	0	°C

Note

1) Measure at the center of the area and at the center of the panel area

2) $T_{op}, T_{st} \leq 40^{\circ}\text{C}$: 0 RH at 100% on

$T_{op}, T_{st} > 40^{\circ}\text{C}$: At 0 RH at 40% on

4. ELECTRICAL CHARACTERISTICS

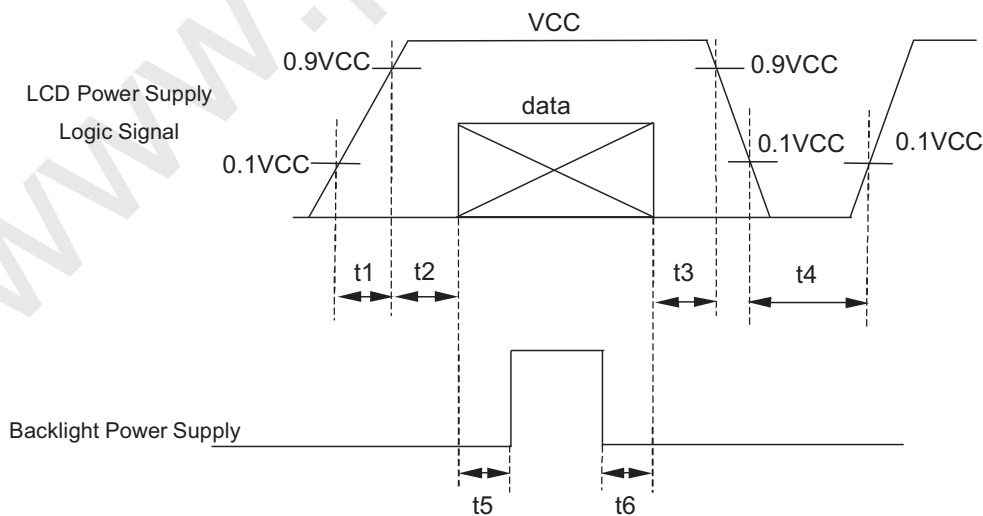
(1) TFT-LCD

Ambient temperature: $T_a = 25^{\circ}\text{C}$

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Remark
Power Supply Voltage for LCD	VCC	0	0	0	V	1)
Power Supply Current for LCD	ICC	--	50	0	mA	2)
Power Input Ripple Voltage	VRP	--	--	100	Vp-p	VCC 0.5 V
Logic Input Voltage	H	V_{IH}	$0.5 \times VCC$	--	V	MODE
	L	V_{IL}	0	--	V	MODE

1) Power and time sequence:

$t_1 \leq 10$ $200 \leq t_4$
 $0 \leq t_2 \leq 50$ $200 \leq t_5$
 $0 \leq t_3 \leq 50$ $0 \leq t_6$

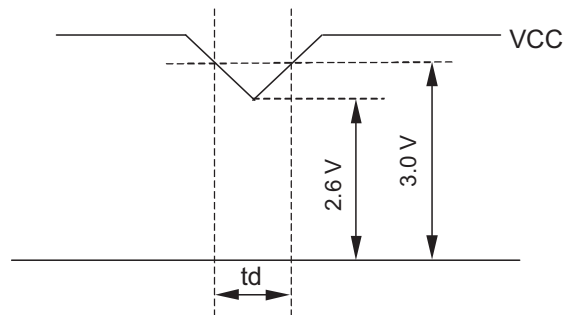


data: RGB DATA, DCLK, DENA, MODE

VCC- p on t on :

- 1) en 2. $V \leq VCC$.0 V, $t \leq 10$
- 2) en VCC 2. V

VCC- p on t on o a o o o t e p o e r a n n a e e n e.



2) VCC . V, H 4 .4 H , V 0 H , CL 1 MH

D p a a e a t t p a p o e r p p r r e n t a e 25 - r a - a r p a t t e r n (t), 00 n e o e.

) F e

Para eter	F e T p e N a e	S p p e r	Re ar
VCC	FCC1 202AB	a a a E e t r Co., Lt .	)

) T e p o e r p p a p a t o e e n e t o e o r e t a n t e e n r r e n t.

(2) Ba t

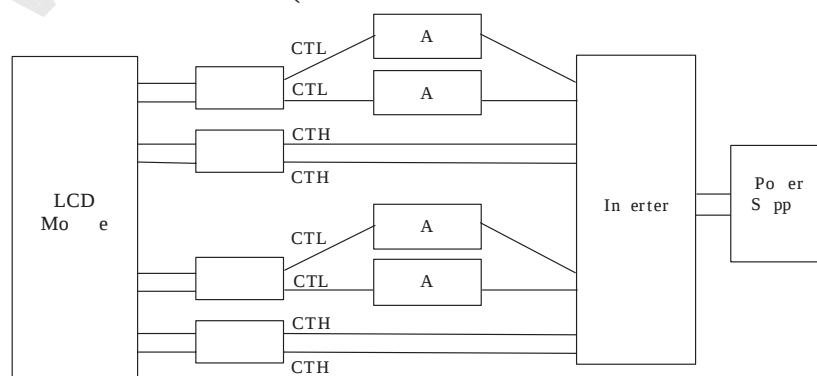
Ta 25 C

ITEM	S MBOL	MIN.	T P.	MA .	UNIT	Re ar
La p Vo ta e	VL	--	20	--	Vr	IL .5 Ar
La p C r r e n t	IL	.5	.5	.5	Ar	2),)
La p Fre en	FL	40	--	0	H	)
Start n La p Vo ta e	VS	1 00	--	--	Vr	Ta 25 C
		1500	--	--		Ta 0 C
		1 50	--	--		Ta -20 C
La p L e T e	LT	50000	--	--		4), 5), IL .5 Ar Cont n o o p e r a t o n

Note

1) P e a e e n r o n o n e r t e r.

2) La p C r r e n t e a r e e n t e t o (T e r r e n t e t e r n e r t e n o o t a e n e.)



) La p r e e n o n e r t e r a p r o e n t e r e n e t o r o n t a n r o n o r e e n ,
a n t a a e o r o n t a e a t o n t e p a . T e r e o r e , p e a e a t a p r e e n , a n
e e p n e r t e r a a r r o o e a p o e o r e e e t r o n e n e t e e n n e r t e r a n
o e t o a o t e n t e r e n e.



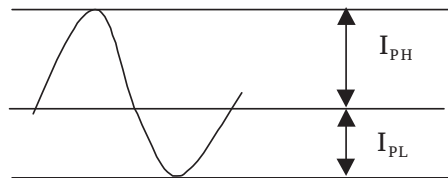
4) The power consumption of the panel is 50 W at 100% brightness, or the power consumption of the panel is 50 W at 100% brightness.

5) The power consumption of the panel is 50 W at 100% brightness, or the power consumption of the panel is 50 W at 100% brightness.

) The power consumption of the panel is 50 W at 100% brightness, or the power consumption of the panel is 50 W at 100% brightness.

The power consumption of the panel is 50 W at 100% brightness.

The power consumption of the panel is 50 W at 100% brightness.



I_{PH} : High level

peak

I_{PL} : Low level

peak

$\frac{I_{PH} - I_{PL}}{I_r} \times 100(\%)$ $\frac{I_{PH} \text{ (or } I_{PL})}{I_r}$
--

CURRENT AVE FORM

5. INTERFACE PIN CONNECTION

(1) CN 1(Interface S na)

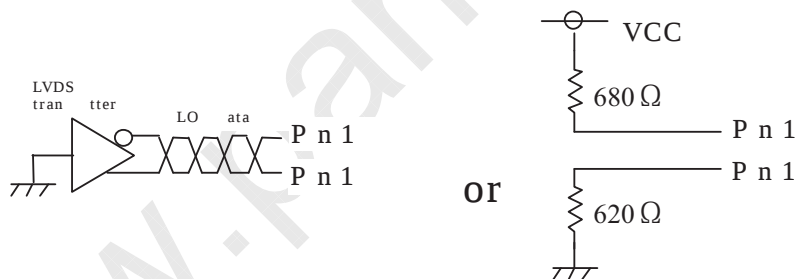
U e onne tor: FI-SEB20P-HFE (JAE)

Corre pon n onne tor: FI-S20S or rete re , FI-SE20ME or FPC (JAE)

P n No.	S o	F n t on (ISP t o pat t o e)		F n t on (ISP t o pat t o e)
		t np t	t np t	
1	VCC	. V Po er pp		←
2	VCC	. V Po er pp		←
	GND	GND		←
4	GND	GND		←
5	L n 0-	R0, R1, R2, R , R4, R5, G0	R2, R , R4, R5, R , R , G2	R0, R1, R2, R , R4, R5, G0
	L n 0	R0, R1, R2, R , R4, R5, G0	R2, R , R4, R5, R , R , G2	R0, R1, R2, R , R4, R5, G0
	GND	GND		←
	L n 1-	G1, G2, G , G4, G5, B0, B1	G , G4, G5, G , G , B2, B	G1, G2, G , G4, G5, B0, B1
	L n 1	G1, G2, G , G4, G5, B0, B1	G , G4, G5, G , G , B2, B	G1, G2, G , G4, G5, B0, B1
10	GND	GND		←
11	L n 2-	B2, B , B4, B5, DENA	B4, B5, B , B , DENA	B2, B , B4, B5, DENA
12	L n 2	B2, B , B4, B5, DENA	B4, B5, B , B , DENA	B2, B , B4, B5, DENA
1	GND	GND		←
14	CL IN-	C o -		←
15	CL IN	C o		←
1	GND	GND		←
1	L n -	See: 2)	R0, R1, G0, G1, B0, B1	R , R , G , G , B , B
1	L n	See: 2)	R0, R1, G0, G1, B0, B1	R , R , G , G , B , B
1	MODE	Lo ISP t o pat t o e		H ISP t o pat t o e
20	NC	Inp t na o e o or open.		←

1) Meta ra e onne te to na GND.

2) Re o en e r n o P n 1 ,1 (t np t)



(2) CN 2,4(Ba t)

Ba t- e onne tor: BHSR-02VS-1 (JST)

In ert- e onne tor: SM02B-BHSS(LF)(SN) (JST)

P n No.	S o	F n t on
1, 2	CTH	VLH (H Vo ta e)

Note

VLH-VBL VL

() CN ,5(Ba t)

Ba t- e onne tor: BHR-02VS-1 (JST)

In ert- e onne tor: SM02(4.0)B-BHS(LF)(SN) (JST)

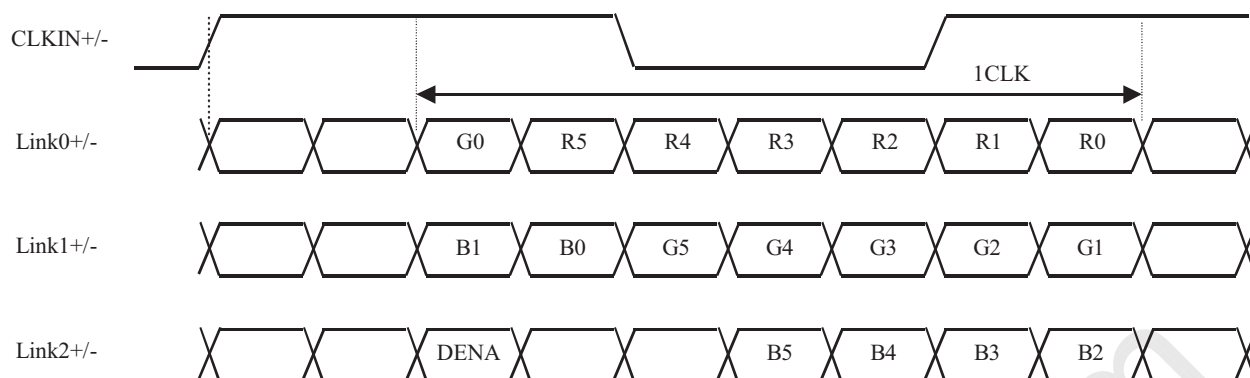
P n No.	S o	F n t on
1, 2	CTL	VBL (Lo Vo ta e)

Note

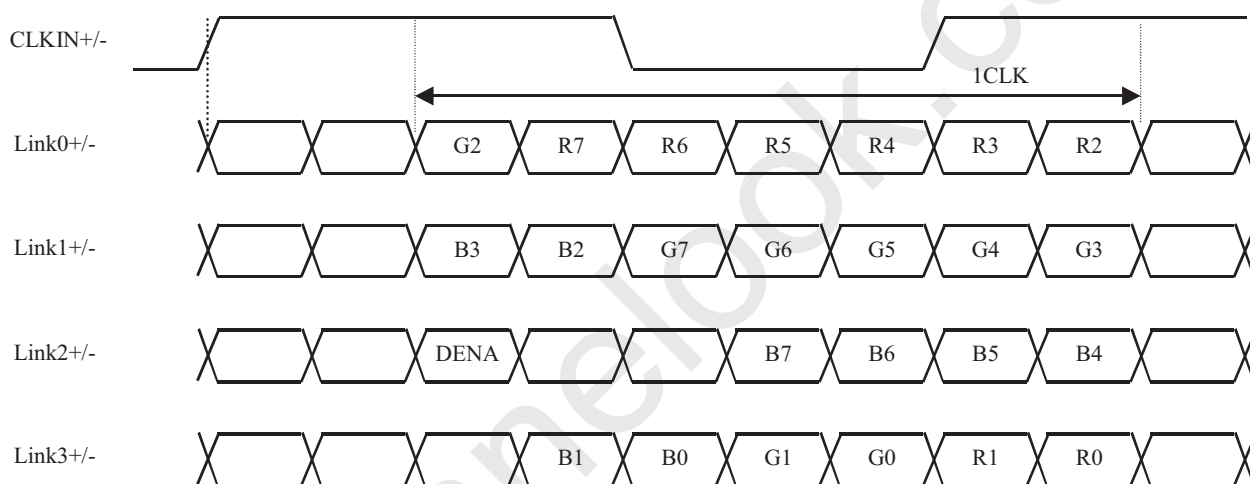
VLH-VBL VL

(4) ISP ata app n

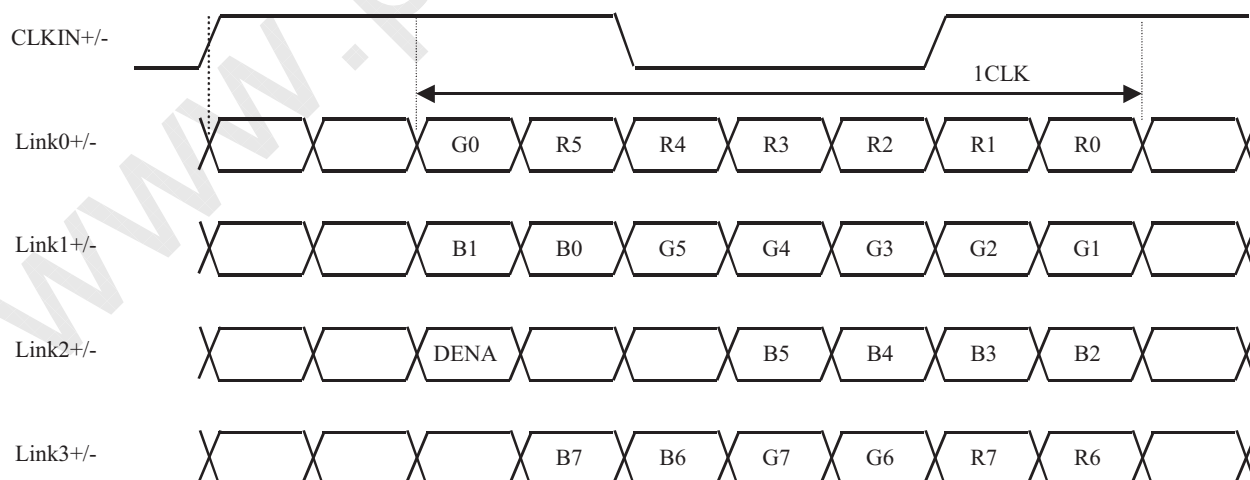
a. ISP t o pat t o e(t np t)



. ISP t o pat t o e(t np t)



. ISP t o pat t o e





6. INTERFACE TIMING

LVDS transter np t na

(1) T n Spe at on

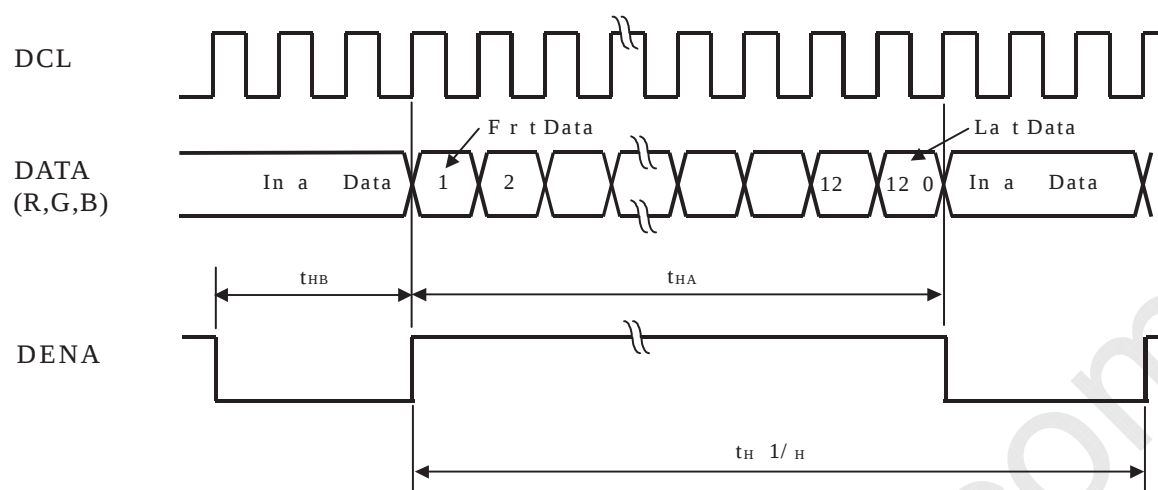
ITEM			S MBOL	MIN	T P	MA	UNIT
DCL	Fre en		CL	50	1	0	MH
	Per o		tCL	12.5	14.1	20	n
DENA	Hor onta	A t eT e	tHA	12 0	12 0	12 0	tCL
		B an n T e	tHB	20	1 0	--	tCL
		Fre en	H	42.4	4 .4	0	H
		Per o	tH	1 .	20.	2 .	μ
	Vert a	A t eT e	tVA	00	00	00	tH
		B an n T e	tVB		2	--	tH
		Fre en	v	55	0	0	H
		Per o	tv	14.	1 .	1 .2	

Note

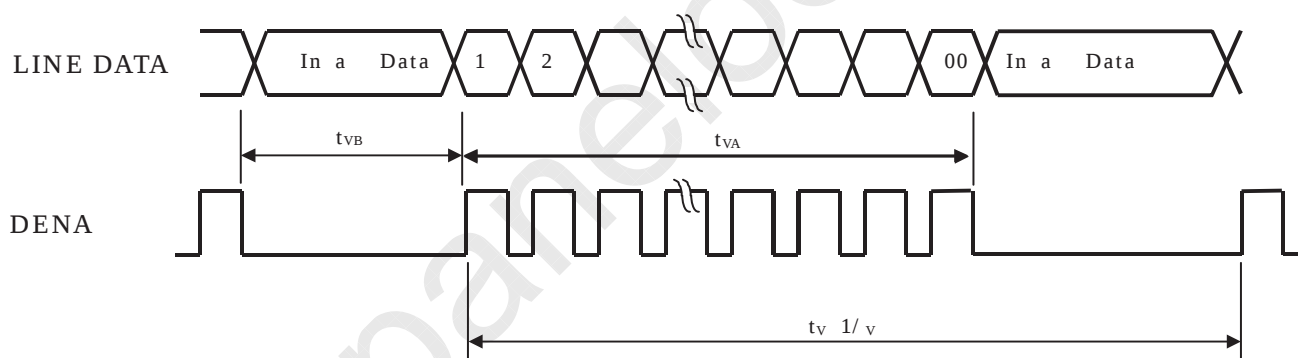
- 1) DENA (Data Ena e) o a a epo t epo art a o n nt et n pe at on.
- 2) DCL o appear rn a n a per o .
- 3) LVDS t n o o t et n pe at on o LVDS re e er IC: THC LVDF 4B(T ne).
- 4) In a eo an n t e t at on, pea e at o o n on t on.
 $t_{VBn} = t_{VBn-1} - (t_H)$

(2) Timing Chart

a. Horizontal Timing Chart



. Vertical Timing Chart





() Color Data Assignment

a. Input

COLOR		INPUT DATA																	
		R DATA						G DATA						B DATA					
		R5	R4	R	R2	R1	R0	G5	G4	G	G2	G1	G0	B5	B4	B	B2	B1	B0
		MSB					LSB	MSB					LSB	MSB					LSB
BASIC COLOR	BLAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED()	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN()	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE()	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED()	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN()	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE()	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Note

1) Definition of color data

Color(n) --- n indicates the color data.

Here n can be 1, 2, 3, 4, 5, 6.

2) Data

1: High, 0: Low

t n p t

COLOR		INPUT DATA															
		R DATA								G DATA							
		R	R	R5	R4	R	R2	R1	R0	G	G	G5	G4	G	G2	G1	G0
		MSB						LSB		MSB						LSB	
BASIC COLOR	BLAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C AN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	ELLO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	HITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
BLUE	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Note

1) De n t on o ra a e

Co or (n) ---n n ate ra a e e e .

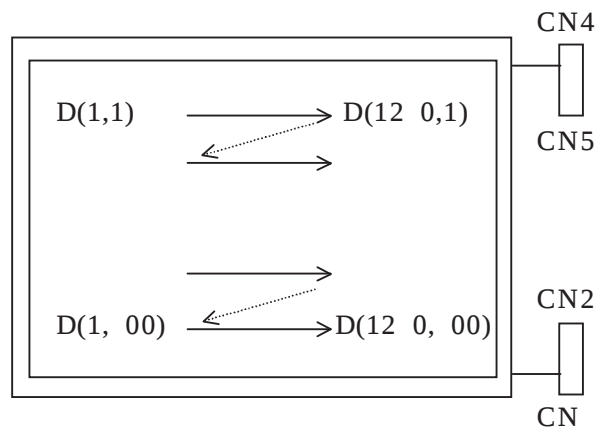
H er n ean r ter e e .

2) Data

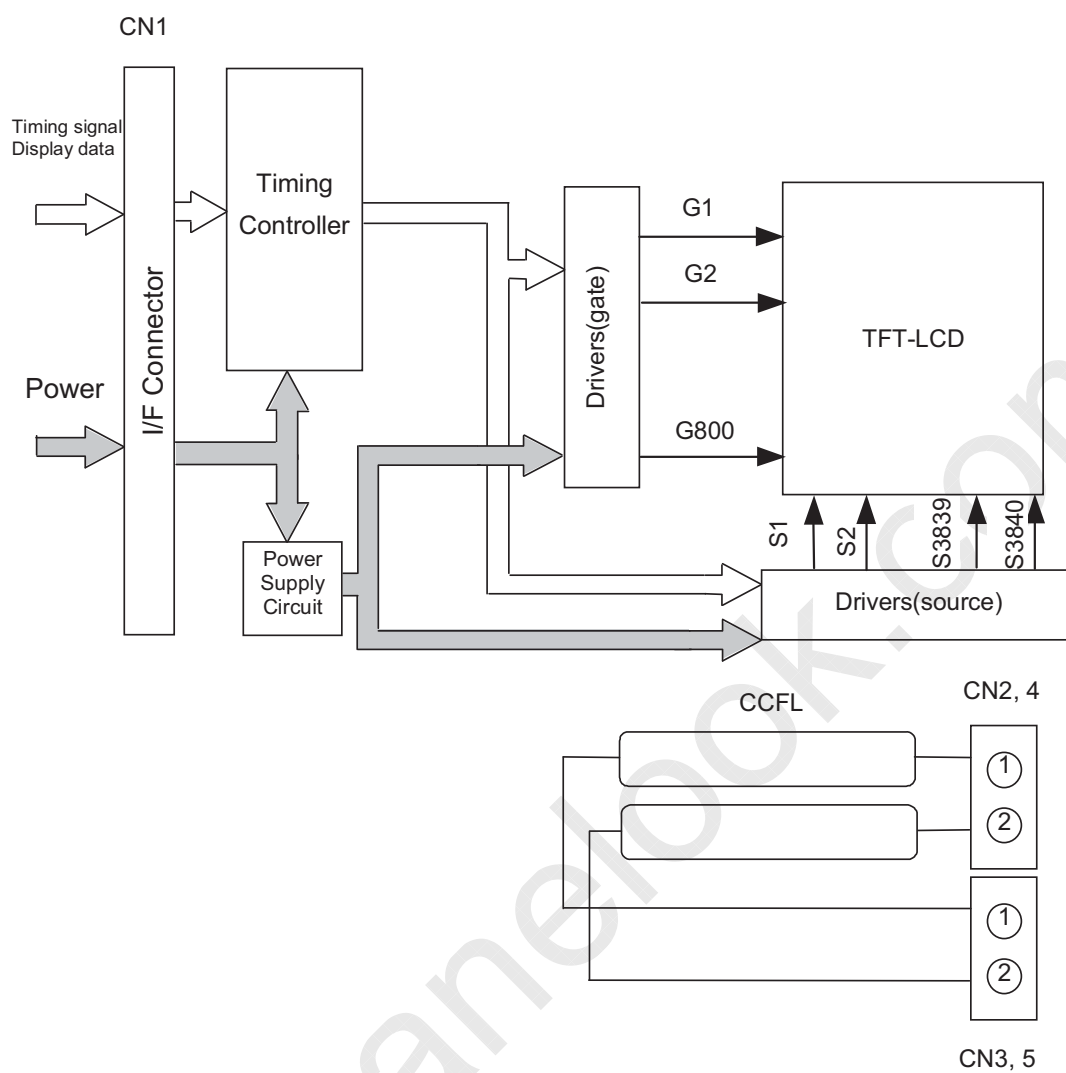
1:H , 0: Lo

(4) Display Position and Direction

D(,) orientation is not necessarily the same.

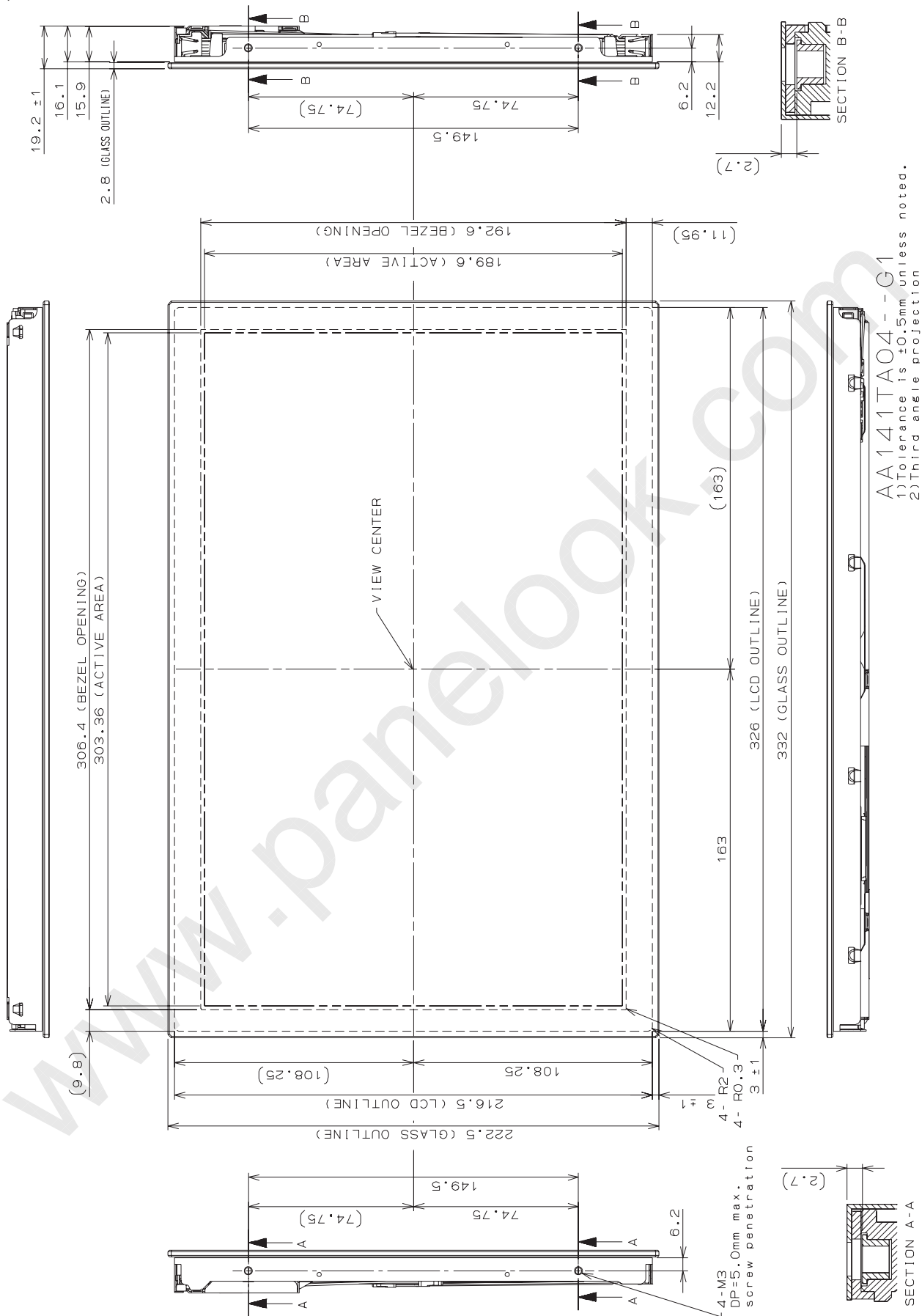


7. BLOCK DIAGRAM



8. MECHANICAL SPECIFICATIONS

(1) Front View



(Unit: mm)

9. OPTICAL CHARACTERISTICS

Ta 25 C, VCC . V, Inp t S na : T p. a e o n n S e t o n

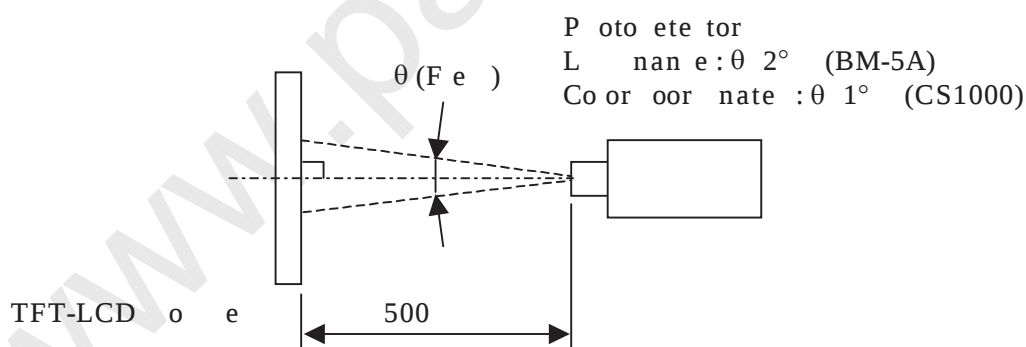
ITEM		S MBOL	CONDITION	MIN	T P	MA	UNIT	Re ar
Contra t Rat o		CR	$\theta_V=0^\circ, \theta_H=0^\circ$	450	00	--	--	1) 2) 5)
L nan e		L	$\theta_V=0^\circ, \theta_H=0^\circ$	440	550	--	/ 2	1) 5)
L nan e Un or t		ΔL	$\theta_V=0^\circ, \theta_H=0^\circ$	--	--	0		1)) 5)
Re pon e T e		tr	$\theta_V=0^\circ, \theta_H=0^\circ$	--	4	--		1) 4) 5)
		t	$\theta_V=0^\circ, \theta_H=0^\circ$	--	12	--		1) 4) 5)
V e n An e	Hor onta	θ_H	CR ≥ 10	- 5~ 5	- 0~ 0	--		1) 5)
	Vert a	θ_V		-55~ 5	- 0~ 0	--		1) 5)
I a e t n		t	2	--	--	2		)
Co or Coor nate	Re	R	$\theta_V=0^\circ, \theta_H=0^\circ$	0.5	0.5	0.2	--	1) 5)
		R		0.11	0.41	0.1		
	Green	G		0.2	0.1	0.4		
		G		0.50	0.5	0.5		
	B e	B		0.122	0.152	0.12		
		B		0.101	0.11	0.11		
	te			0.2	0.1	0.4		
				0.2	0.2	0.5		

Note

T e e t e a r e e a r e n CS1000(MINOLTA) or o o r o o r n a t e , E Contra t(ELDIM) or e n a n e a n CS1000 or BM-5A(TOPCON) or o t e r n e r t e a r r o o n t o n (n o a e n t t) a t e r o r e t a n 0 n t e r o t r n n o n t e a p n e n o t e .

Con t on: IL .5 Ar , FL 50 H

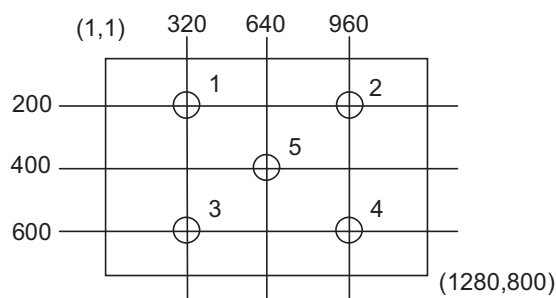
Mea re e n t e t o o r n a n e a n o o r o o r n a t e a o o .



T e n a n e e a r e a o r n t o FLAT PANEL DISPLA MEASUREMENTS STANDARD (VESA Stan ar).

1) Measurement Point

Contrast Ratio, Luminance, Response Time, View Angle, Color Coordinate: Display Center
Luminance Unit: point 1~5 on the reference



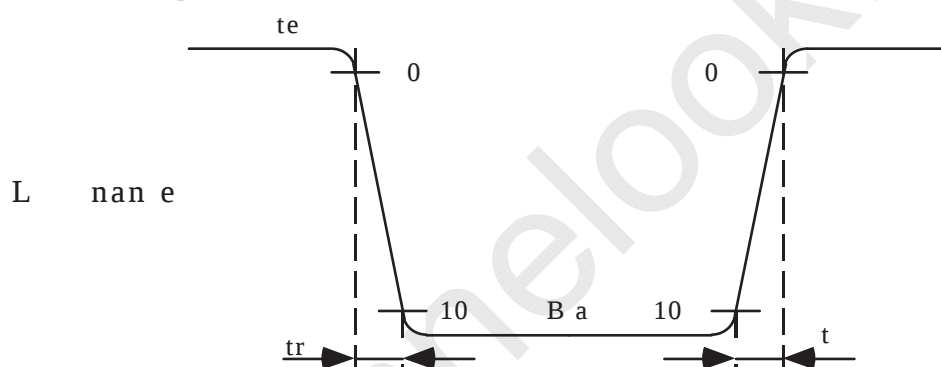
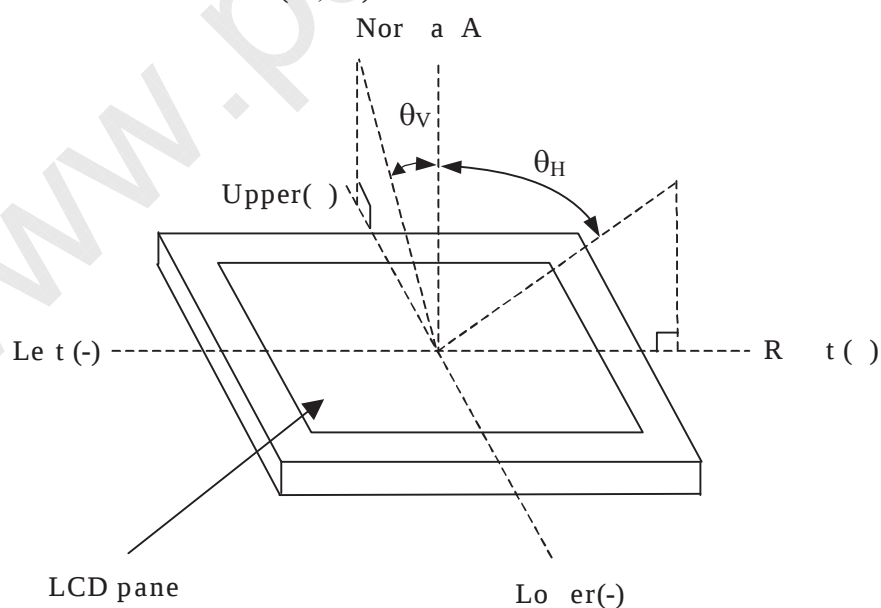
2) Definition of Contrast Ratio

CR = Luminance of white / Luminance of black

3) Definition of Luminance Unit

$\Delta L = (L_{MAX} - L_{MIN}) / (L_{MAX} - L_{MIN}) - 1 \times 100$

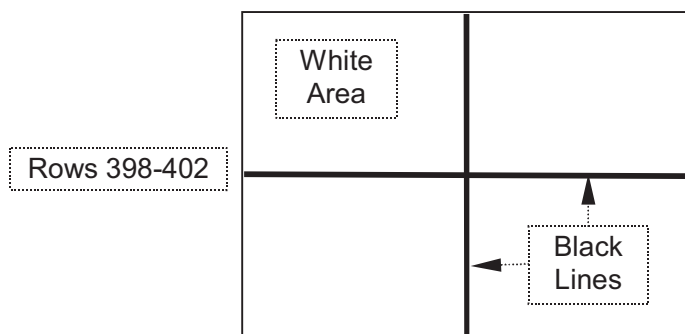
4) Definition of Response Time

5) Definition of View Angle (θ_V, θ_H)

) I a e t n :

Cont n o p a t e t pattern o n n t e r e e o o r t o - o r . T e n p a a
o p e t e t e r e e n . T e p r e o a e a n o t p e r t o r e t a n t o e o n a t 25 C .

Cols 638-642



TEST PATTERN FOR IMAGE STICKING TEST



10. RELIABILITY TEST CONDITION

(1) Temperature and Humidity

TEST ITEM	CONDITIONS
HIGH TEMPERATURE HIGH HUMIDITY OPERATION	40 C, 0 RH, 240 (No on en at on)
HIGH TEMPERATURE OPERATION	0 C, 240
LOW TEMPERATURE OPERATION	-20 C, 240
HIGH TEMPERATURE STORAGE	0 C, 240
LOW TEMPERATURE STORAGE	-20 C, 240
THERMAL SHOCK (NON-OPERATION)	-20 C (1) ~ 0 C(1), 100 e

(2) Shock and Vibration

ITEM	CONDITIONS
SHOCK (NON-OPERATION)	Shock pulse: 0.5 / 2 (100G) Pulse width: 110 μs, 2 Number of pulses: one pulse per test area perpendicular to the surface of the panel
VIBRATION (NON-OPERATION)	Vibration pulse: 1.0 / 2 (1.0G) Pulse width: 110 μs Frequency range: 5 to 500 Hz Frequency sweep rate: 0.5 octaves/min Duration: one sweep from 5 to 500 Hz per test area perpendicular to the surface (each test area: 100 mm x 100 mm)

(3) Joint Tensile

The test is performed on the test area of the panel as follows:

Part A: Normal panel test, no special test part is required. (e.g. normal test)

Part B: Test on the test area of the panel. (e.g. normal test)

Part C: No special test, no special test part is required. (e.g. normal test)



11. OTHER FEATURE

This LCD module is RoHS compliant.

RoHS: Restriction of the use of certain hazardous substances
compliant



. Be re to onne t t e a e an t e onne tor orre t .

(2) OPERATING PRECAUTIONS

- a. Pea e e re to t rn o t e po er pp e ore onne t n an onne t n na np t a e.
- . Pea e o not an e ara e re tan e ett n n LCD o e. T e are a te to t e o t ta e a e. I t e are an e , t t appen LCD oe not at t e ara ter t pe at on.
- . LCD a t ta e on er t e to e o e ta e o ra at on ara ter t n o te perat re t an n roo te perat re.
- . T e nter a e na pee er . Pea e pa attent on to tran on ne e n an ot er pee na pre a t on to at na pe at on.
- e. Con en at on t appen on LCD r a e an n e o LCD o e n a e o en an e o a ent te perat re. Pea e ta e are o a not to a e an a a e ent one on (1)-e.
- . Pea e pa attent on not to pa t e a e pattern or er on t e. I a e t t on LCD. E en a e t n appen , t a appear a t e operat on t e pro ee .
- . Pea e o e t e a e a e n tr t on a one en prepare or or nar e e tron pro t .

(3) PRECAUTIONS WITH ELECTROSTATICS

- a. T LCD o e e CMOS-IC on r t oar an TFT-LCD pane , an o t ea to e a e te e e tro tat . Pea e e are t e e tro tat t e a o o r o onne t n to t e ro n an o on.
- . Pea e re o e prote t on er o ro reen r a e o LCD o e to pre ent ro e e tro tat o rren e.

(4) STORAGE PRECAUTIONS

LCD o e tore n t e roo te perat re en ron ent t nor a t . T e LCD n entor o e pro e e r t- n r t- o t et o .

(5) SAFETY PRECAUTIONS

- a. en o a te a a e or nne e ar LCD , t re o en e to r LCD nto pee an a t e o t o ent a a etone an et ano , o ater e rne .
- . I an ea o to a a a e a e an o e n on ta t t t e an , a o t oro t oap an ater.
- . Be re to t rn o t e po er pp en n ert n or onne t n t e a e.
- . In erter o e e ne are to t or top t n t on en o er rrent ete te



on t e on t e a p.

(6) OTHERS

- a. A tron n ent t nto LCD pane a a e eter orat on to po ar er , o or ter, an ot er ater a , e ra e t e a t o pa ara ter t . P ea e o not e po e LCD o e n er tron U tra o et ra ora on t e.
- . P ea e pa attent on to reen r a e o LCD o e not to onta t t ot er ater a n pre er n t a one.
- . For t e pa a n o an n , p ea e ee an o e t t e pa a n pe at on ata eet.
- . P ea e o not re e t e La p Un t on e re o e .